
Short Communication

Oryza nivara in Australia?

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This paper expands on notes provided on *Oryza nivara* S.D.Sharma & Shastry (1965) in the *Flora of Australia* Poaceae Volume 44A (Kodela 2009), where this species is treated as an excluded taxon.

Oryza nivara is part of the *O. sativa* L. complex and is related to *O. rufipogon* Griff. and *O. meridionalis* N.Q.Ng (in the AA genome group of wild rice). Sharma and Shastry (1965) describe how *O. nivara* differs from the closely related species *O. sativa* and *O. rufipogon*, but in a revision of the genus Duistermaat (1987) placed it in synonymy with *O. sativa*, whilst others have possibly confused *O. uivara* with *O. meridionalis*. There is also the possibility of the existence of intermediate forms between the various species.

Lu and Jackson (2004) distinguish *O. meridionalis* from *O. nivara* mainly on the basis of the spikelets, i.e. usually less than 2 mm wide in *O. meridionalis* and usually greater than 2 mm wide in *O. nivara*. The awn can also be distinctly longer in *O. meridionalis* (D. Vaughan, pers. comm.). However, where characteristics overlap there appear to be few other reliable morphological features to separate the species (P.G. Kodela, pers. obs., B.K. Simon, pers. obs. & comm.). There are also issues relating to the habit of the species where *O. rufipogon* (usually perennial), *O. meridionalis* (usually annual) and *O. nivara* (usually annual) may be influenced by a range of habitat factors such as wetter to drier conditions or deeper to shallower water.

Oryza nivara is reported to occur in India, Sri Lanka, Nepal, Bangladesh, Myanmar, Laos, Thailand, Cambodia, Vietnam, Malaysia and introduced into the U.S.A. and Australia (Vaughan 1994, Lu & Jackson 2004). The basis for a cited Northern Territory distribution of *O. uivara* (Sharma & Shastry 1965) is unknown, while a record of *O. nivara* from Queensland (Vaughan 1994, Anon. 2005) is based on *J.R.Clarkson 7320* from Red Lily Lagoon, Lakefield National Park (BRI, K, L, NSW) (D. Vaughan & B.K. Simon, pers. comm.). However, the Clarkson specimen and others from Australia with similar spikelet dimensions (i.e. > 2 mm wide) have been identified by most Australian experts as *O. meridionalis*. Further investigation, including study of Type material, is required to determine whether *O. uivara* occurs in Australia.

As well as the holotype of *Oryza uivara* (i.e. near Kandagarh, 16 km S of Raigarh, Madhya Pradesh, India, 15 Oct 1960, S.D.Sharma 69; CAL), Sharma and Shastry (1965) cite a number of paratypes, including *Pullen 1941* (LAE) from Papua New Guinea. Further investigation strongly suggests this is a typographical error for *Pullen 1641* (CANB71016, L, LAE), a specimen determined at CANB as *O. rufipogon* and described by Duistermaat (1987), who did not realise it was a paratype of *O. uivara*, as a possible local East Sepik form of *O. rufipogon* that has large spikelets with long sterile lemmas. This form has subsequently been referred to as a perennial *O. rufipogon* ecotype with

similarities to *O. meridionalis* (Vaughan et al. 2008). Material of *Pullen 1941* was not located at LAE (R. Banka, pers. comm.); however, *Pullen 1941* held at CANB is a specimen of *Microtis* sp. (Orchidaceae) from Australia.

In conclusion, the status and placement of *O. nivara* is uncertain, especially in the Australian context where specimens appear to be difficult to distinguish from other AA genome *Oryza* species. There may well be introduced AA genome wild rice from Asia in Australia (brought in by birds or humans) and there appear to be intermediates and the possibility for hybrids that would complicate the current understanding of the taxa present (e.g. the status of *O. nivara*). The complex nature of *Oryza* in Australia warrants detailed study (D. Vaughan, pers. comm.).

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References

- Anon. (2005) *The Biology and Ecology of Rice (Oryza sativa L.) in Australia*. Office of the Gene Technology Regulator, Australian Government Department of Health and Ageing. [http://www.ogtr.gov.au/internet/ogtr/publishing.nsf/Content/rice-3/\\$FILE/biologyrice1.pdf](http://www.ogtr.gov.au/internet/ogtr/publishing.nsf/Content/rice-3/$FILE/biologyrice1.pdf)
- Duistermaat H (1987) A revision of *Oryza* (Gramineae) in Malesia and Australia. *Blumea* 32: 157–193.
- Kodela PG (2009) *Oryza*. Pp. 361–368 in Wilson A (ed.) *Flora of Australia*, vol. 44A, Poaceae 2. (ABRS, Canberra/CSIRO Publishing, Melbourne)
- Lu B-R & Jackson M (2004) *Wild Rice Taxonomy* (2004) International Rice Research Institute. <http://www.knowledgebank.irri.org/wildRiceTaxonomy/print.doc>
- Sharma SD & Shastri SVS (1965) Taxonomic studies in genus *Oryza* L. III. *O. rufipogon* Griff. *sensu stricto* and *O. nivara* Sharma et Shastri *nom. nov.* *Indian Journal of Genetics and Plant Breeding* 25: 157–167.
- Vaughan DA (1994) *The Wild Relatives of Rice: Genetic Resources Handbook*. (IRRI: Los Banos, the Philippines)
- Vaughan DA, Lu B-R & Tomooka N (2008) The evolving story of rice evolution. *Plant Science (Elsevier)* 174: 394–408.

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